CLAIMS

What is claimed is:

1. A complex multiplier for adjusting phase and/or gain imbalances in a signal comprising:

a first set of multiplication units to multiply an in-phase ("I") component of said signal by a first set of coefficients; and

a second set of multiplication units to multiply a quadrature ("Q") component of said signal by a second set of coefficients,

wherein each of said coefficients in said first set and said second set are independently modifiable relative.

2. The complex multiplier as in claim 1 further comprising:

one or more adders for summing products of said coefficients and said I and Q components.

3. The complex multiplier as in claim 1 further comprising:

phase compensation logic to detect a phase imbalance in said signal and to modify one or more of said coefficients to correct said phase imbalance.

4. The complex multiplier as in claim 1 further comprising:

gain compensation logic to detect a gain imbalance in said signal and to modify one or more of said coefficients to correct said gain imbalance.

5. The complex multiplier as in claim 1 wherein said I and Q components are transmitted from an output of a fast-Fourier transform ("FFT") module.

6. The complex multiplier as in claim 5 further comprising:

one or more adders for summing the products of said coefficients and said I and Q components.

7. The complex multiplier as in claim 6 wherein said products are transmitted to an inverse FFT module.

8. A method comprising:

independently adjusting amplitude and/or phase in a complex signal by providing one or more additional, independently-adjustable coefficients to multiply with said amplitude and/or phase values associated with said signal.

9. The method as in claim 8 wherein said complex signal is comprised of in-phase ("I") and quadrature ("Q") components.

10. The method as in claim 8 wherein said coefficients are frequency coefficients and said multiplication is performed after a fast-Fourier transform ("FFT") is performed on said signal.

11. The method as in claim 8 further comprising:

adding products of each of said multiplications to produce a sum of said products.

12. The method as in claim 11 further comprising:

performing an inverse FFT on said sum of said products.

13. A complex multiplier comprising:

means for independently adjusting phase and/or gain of a signal using a complex multiplier.

14. The complex multiplier as in claim 13 wherein said means for adjusting further comprises:

providing one or more additional, independently adjustable coefficients to multiply with I or Q components of said signal.

15. A machine-readable medium having code stored thereon which defines an integrated circuit (IC), said IC comprising:

a first set of multiplication units to multiply an in-phase ("I") component of said signal by a first set of coefficients; and

a second set of multiplication units to multiply a quadrature ("Q") component of said signal by a second set of coefficients,

wherein each of said coefficients in said first set and said second set are independently modifiable relative.

16. The machine-readable medium as in claim 15 further comprising:

one or more adders for summing products of said coefficients and said I and Q components.

17. The machine-readable medium as in claim 15 wherein said IC further comprises:

phase compensation logic to detect a phase imbalance in said signal and to modify one or more of said coefficients to correct said phase imbalance.

18. The machine-readable medium as in claim 15 wherein said IC further comprises:

gain compensation logic to detect a gain imbalance in said signal and to modify one or more of said coefficients to correct said gain imbalance.

19. The machine-readable medium as in claim 15 wherein said I and Q components are transmitted from an output of a fast-Fourier transform ("FFT") module.

20. The machine-readable medium as in claim 19 wherein said IC further comprises:

one or more adders for summing the products of said coefficients and said I and Q components.

21. The machine-readable medium as in claim 20 wherein said products are transmitted to an inverse FFT module.

22. A computer-implemented method comprising:

performing a fast-Fourier transform ("FFT") on a complex signal to produce complex frequency components of said signal;

multiplying said complex frequency components with a series of frequency coefficients to independently control gain and/or phase of said complex signal; and

performing an inverse fast-Fourier transform ("IFFT") to convert said complex signal into the time domain.

23. The method as in claim 22 wherein said complex signal is comprised of in-phase ("I") and quadrature ("Q") components.

24. The method as in claim 22 wherein, to decimate said complex signal, only M out of N frequency components are multiplied by said coefficients, wherein $M < N$.

25. The method as in claim 22 further comprising:

detecting a phase imbalance in said complex signal and modifying one or more of said frequency coefficients to correct said phase imbalance.

26. The method as in claim 22 further comprising:

detecting a gain imbalance in said signal and modifying one or more of said frequency coefficients to correct said gain imbalance.